Cornell University
Cooperative Extension
Putnam County

Terravest Corporate Park
1 Geneva Road
Brewster NY 10509
p. 845-278-6738
f. 845-278-6761
e. putnam@cornell.edu
www.cce.cornell.edu/putnam

Reducing Deer Damage to Ornamental and Garden Plots

Paul D. Curtis, Cornell Cooperative Extension

Milo E. Richmond, New York Cooperative Fish and Wildlife Research Unit

Fencing

Where deer are abundant or crops are especially valuable, fencing can be an effective means of reducing deer damage. While a variety of fence types may successfully deter deer, consideration should be given to the following:

1. **Fencing as an absolute barrier** can be achieved in one of two ways. The preferred approach is the construction of at least an 8– foot–high woven–wire fence that completely encloses plants requiring protection. If deer must be kept out entirely, this is the only reliable method. Fences reaching 5, 6 or even 7 feet are useful deterrents, but do not always provide complete exclusion. The eight foot fence is expected to last 20–30 years and costs $6 to $8 per foot to install. Details of construction, cost, materials needed, and design information can be found in publications listed in the tables at the end of this document.

An alternative barrier that may be useful in certain circumstances consists of a smaller welded–wire fence which includes a top so that the plants to be protected are completely enclosed. This procedure may be more economical for protecting bedding plants or specialty crops such as asparagus, broccoli or perennial flowers. This approach can also be combined with other fencing deterrents to save a particular plant or high–value crop. This smaller, complete exclosure can be cost– effective for very small garden plots or isolated plantings.

Anyone who has made a significant financial commitment to the production of bedding plants, cut flowers, Christmas tree seedlings, or speciality crops of fruit or vegetables should seriously consider a woven–wire fence that is at least eight feet in height. While the initial cost is higher than that for other types of fencing, the commercial investment may only be ensured with absolute protection. Such a barrier may be practical for plots ranging from 25' x 25', up to 50 or more acres if absolute protection is warranted. A finer–mesh wire (i.e., one inch– hexagonal chicken wire or 1x2–inch welded– wire) can be added to the bottom to prevent other pests such as rabbits and woodchucks from

entering the protected area. If raccoons are a problem, the addition of a single strand of electrified wire located 4 inches above ground around the outside perimeter of the fence will deter all except the most persistent animals.

The placement of an absolute barrier need not be an eyesore if attention is given to details of construction, including proper setting of corner posts, a wide gate frame for easy access, and addition of screening plants to landscape the fence. Small home–garden–sized plots may be made more accessible to tillers and small tractors by permanent construction of three sides of the fence, leaving the fourth side to be covered by a portable, removable section. Such a portable fence can be built in framed sections small enough to remove by hand if needed.

The alternative barrier for small planting beds may be a much lower fence depending upon the crop needing protection. Plants started in seedbeds may be protected with a one– or two–foot high covered fence. A practical fence of this type can be constructed by installing two parallel fences far enough apart so that one can work comfortably in between, but close enough so that a wire top and ends can be fitted into place after planting.

2. **Non–electric fences** may be sufficient to keep deer out of an area if their density is not particularly high (≤10 mi2) and a variety of natural foods are available. Several sizes of welded or mesh wire can be combined with additional single wires. For vegetable or flower gardeners who do not wish to lose plants to deer or other wildlife pests, we recommend a 1/2–inch welded–wire fence three feet high, with the bottom edge buried 6 inches buried beneath the soil. This will deter rodents, rabbits, and woodchucks from entering the area. With an additional 3 wires spaced 1 1/2 feet apart above the welded wire, this design is a suitable exclosure but not an absolute barrier for deer.

3. Electric fences. Several types of electric fencing provide a less expensive, yet effective alternative to the complete barrier described earlier. The polytape live–stock electrical fencing coated with peanut butter can be effective for home gardens and small nurseries or truck crops up to 40 ac. This simple, temporary fence works best under light deer pressure during summer and fall. The poly–tape fence apparently attracts deer with its bright color and peanut butter odor. Deer make nose–to–fence contact when they approach, receiving a substantial shock and quickly learn to avoid such fenced areas. Polytape fences are portable, have a life expectancy of more than 15 years, and can be installed for $0.10 to $0.25 per foot. A variation of this fence substitutes a suitable repellent such as HinderTM or Big Game RepellentTM for peanut butter, and in recent studies is shown to be even more effective at repelling deer. Certainly the combination of electronic shock with either attractants or malodorous repellents is more effective than electric fences alone.

The vertical, high–tensile electric fence is a proven deterrent to deer and is effective in 6– or 7–wire combination. Because deer choose to crawl under or step through a fence rather than jump over it, the spacing of the wire is critical. The bottom wire should be 10 inches above the ground with additional wires at 10– to 12–inch spacing to be effective.

This is a permanent fence with a 20 to 30 year lifespan. Materials include high–tensile, smooth steel wire (200,000 PSI, 12 1/2 gauge) with accessories to maintain up to 250 lbs. wire tension. A high–quality fence energizer that delivers a minimum of 5,000 volts at a maximum pulse is essential. Installation and material costs range from $0.50 to $1.50 per foot. Costs are reduced by increasing the area to be fenced. Identify any electric fence with warning signs placed at 100 foot intervals, with at least one sign on each fence border. For tips on construction consult a fencing contractor or references in this booklet.

A modification of the vertical fence is the slanted 7–wire electric fence which has proven effective for larger acreages. This fence is constructed in much the same way as the vertical fence but slants outward to present the deer with a more effective two–dimensional barrier. With all electric fences vegetation must be carefully controlled beneath the fence to avoid loss of power. The slanted fence requires more extensive vegetation control, and can be maintained with herbicide sprays or gas– powered weed trimmers.

Another design consists of a 3–wire combination of electrical fencing, deer repellent, and visual cue. This fence is economical, easy to build, and quite effective if maintained in good working order. Standard 7– or 8–foot wooden or steel posts, with electrical wires placed 18, 36 or 54 inches above ground, can be supplemented with 5– or 6–inch strips of cotton cloth stapled to the wires at 10–foot intervals. The cloth strips are then saturated with odor–based repellents (i.e., HinderTM or Big Game RepellentTM) and the wires are energized with at least 5,000 volts. Solar– powered charging units are available that will hold a charge for 24 hours even on cloudy days. The addition of another electrical wire 4 inches above ground will exclude most woodchucks and raccoons, but not rabbits and mice.

With electrical fencing of any design it is important to remember that:

1. A quality energizer that delivers a minimum of 5,000 volts is a must.

2. High–tensile fences require strict adherence to construction guidelines (i.e., corner assembly, wire configurations and maintenance).

3. Cost of construction decreases with increasing size of the plot to be fenced.

Repellents

Several deer repellents are available to the home gardener, and function either as taste or odor repellents. Most commercially–available repellents can be applied as a spray to ornamental shrubs and non–bearing fruit trees. Generally, repellents are only partially effective. There is nothing on the market that provides absolute protection. Repellents are most effective when applied on a regular 4–week schedule, before serious damage has begun. They work best on plants that are low on the deer's preference list, and especially when alternate natural foods are available. Recent studies indicate satisfactory protection of perennial flower beds and some vegetable gardens by alternating the use of more than

one repellent. For example, thiram applied as a spray coupled with BGRTM or HinderTM on a cotton rope around the perimeter of the flower bed has provided good protection in a number of recent trials. Other useful combinations are still to be discovered as we seek even better ways to protect garden plantings.

Deer Away®/Big Game Repellent® (37 % commercial putrescent egg solid*)*

This material is primarily an odor-based repellent, and has been used extensively in western conifer plantations. It is reported to be > 85 % effective in field studies, and is registered for use on fruit trees prior to flowering, and ornamental and Christmas trees. Apply it to all susceptible new growth and leaders. Applications weather well and are effective for a minimum of 5 weeks with heavy feeding pressure by deer. A one-gallon liquid kit costs about $26 and covers 15 to 18, 4-foot ornamental shrubs or 100-150 seedlings.

Deer-Off Repellent Spray (3.1 % egg solids, 0.0006 % capsaicin, and 0.0006 % garlic)

Deer-Off is a combination odor and taste-based product registered for use on flowers, grass, bulbs, ornamental shrubs, edible crops, plants, seedlings and trees. Deer-off is available as a spray and should be applied to all leaves, stems and branches at the beginning of each season. Treatment must be repeated after heavy rains or as new growth emerges, and if the effects of the previous treatment appear to be wearing off. A one-pint kit of deer-off costs about $28.00, makes about 1 gallon of spray, and treats up to 200 ornamental shrubs 4 feet in height, or approximately 2,000 square feet of plants depending on surface conditions and size of plantings.

Hinder® (ammonium soaps of higher fatty acids, 13.8%*)*

This odor-based product is one of the few repellents registered for use on edible crops. Hinder can be applied directly to home gardens, ornamentals, annual and perennial flowers, and fruit trees until 1 week before harvest. Its effectiveness is usually limited to 2 to 4 weeks but varies because of weather and application technique. Reapplication may be necessary after heavy rains. Apply at temperatures above 40°F. One gallon of liquid costs about $40, and when mixed with 100 gallons of water will cover one acre. Hinder can also be painted full strength on the bark of trees to prevent rabbits from chewing the bark. Hinder is compatible for use with most pesticides.

Miller's Hot Sauce® Animal Repellent (2.5 % capsaicin)

This taste-based repellent is registered for use on ornamentals, fruit and nut trees, bushes, vines and hay bales stored in the field. Apply it with a backpack or trigger sprayer to all susceptible plant parts, such as leaders and young leaves. Do not apply to fruit-bearing plants after fruit set. Vegetable crops also can be protected if sprayed prior to the development of edible parts. Weatherability can be improved by adding an anti-transpirant such as Nu-Film-17® or Vapor Gard®. Hot Sauce and Vapor Gard® cost

about $80 and $30 per gallon respectively. Eight ounces of Hot Sauce and 2 quarts of anti-transpirant mixed with 100 gallons of water will cover 1 acre. The 10x and 100x concentrations approved for ornamentals have effectively prevented both deer and elk damage to trees.

Nott's Chew-Not (20 % thiram)

Thiram, a fungicide that acts as a taste-based repellent, is registered for use on dormant trees and shrubs. A liquid formulation is sprayed or painted on individual trees. Although thiram itself does not weather well, adhesives such as Latex 202-A® or Vapor Gard® can be added to the mixture to increase its resistance to weathering. Thiram-based repellents also protect trees against rabbit and vole damage. Two gallons of 42 percent thiram cost about $50 and when mixed with 100 gallons of water will cover 1 acre.

Tree Guard (0.20 % dentonium benzoate)

Tree Guard is a taste-based repellent registered for use on shrubs, ornamental plants, conifers and non-bearing deciduous trees. Tree Guard is available as a ready-to-use spray and costs about $40. One gallon will treat 16 to 20 global arborvitae 20-24" high. This product is not intended for use on food or feed crops. A recent Cornell University study indicated that this material was not effective for protecting Japanese yews from deer damage during winter.

Other Measures

The use of dogs as a frightening device is another alternative that merits attention. A dog of sufficient size and temperament may be kept on a leash near the garden and allowed to stay outdoors overnight. A number of deer damage problems have been alleviated with a system such as this. An alternative that has shown great promise in recent experiments is the use of a dog contained by a buried electrical ("invisible") fence. Such an invisible fence has great utility in keeping the dog at home, while simultaneously repelling deer from the property. More research is needed before we can recommend what breed of dog is most effective, and determine how much area one dog can protect.

Noise–making devices (i.e., exploders, sirens, whistles, etc.) are not recommended for the home garden because of the disturbance to neighbors and lack of effectiveness. Deer readily acclimate to the noise and are little disturbed after a few days of exposure.

Choice of Landscape Plantings

Homeowners are often faced with the dual problem of preventing deer from damaging a vegetable garden and/or a few fruit trees, while also protecting ornamental shrubs, flowers, and trees. In the first instance, the choice of garden plants is dictated by the owners desire for specific products, so little compromise is possible. With ornamental plants, however, the homeowner has some additional latitude in choice of species and variety, and may avert future problems and expenses by selecting landscape materials from a list of plants considered less desirable to deer. Publications describing the most–and least–preferred food plants for deer are available. Such lists may vary somewhat across broad geographic regions, but are generally reliable (Appendix A). This information can be useful both for selecting plants that are unlikely to be damaged by deer, and identifying those ornamentals that almost certainly will require protection from deer, even in areas where populations are low and feeding patterns are selective.